NUTRITION REVIEWS

VOLUME 29 NUMBERS 1–12

January–December 1971

Published by

THE NUTRITION FOUNDATION, INC.

99 PARK AVENUE NEW YORK, N. Y. 10016

Copyright, 1971, Nutrition Foundation, Inc., New York, N. Y., U.S.A.

XUM

The quality and independence of the research program are safeguarded by referee action and counsel of the Scientific Advisory Committee.

SCIENTIFIC ADVISORY COMMITTEE

GEORGE M. BRIGGS
University of California
WILLIAM J. DARBY
Vanderbilt University School of Medicine
WILLIS A. GORTNER
Agricultural Research Service, USDA
ALFRED E. HARPER
University of Wisconsin
JOHN H. HOPPER
Representative from Industry
HARTLEY W. HOWARD
Representative from Industry
CARL H. KRIEGER
Representative from Industry
CHARLES U. LOWE
National Institutes of Health
CARL PFAFFMANN
The Rockefeller University
ROBERT E. SHANK
Washington University School of Medicine
FREDRICK J. STARE
Harvard School of Public Health
ELMER H. STOTZ
University of Rochester
THEODORE B. VAN ITALLIE
St. Luke's Hospital
P. B. Pearson, Chairman
H. L. Sipple, Secretary

THOSE WHO SUPPORT THE FOUNDATION

MEMBERS: Allied Chemical Corporation, Alton Box Board Company, American Can Company, American Home Products Corporation, American Lecithin Company, Inc., American Maize Products Company, Amstar Corporation, Armour and Company, Atlas Chemical Industries, Inc., Beech-Nut, Inc., Borden, Inc., Campbell Soup Company, Central Soya Company, The Coca-Cola Company, Container Corporation of America, Continental Can Company, Inc., CPC International, Inc., Del Monte Corporation, Florasynth, Inc., Fritzsche-Dodge & Olcott, Inc., General Foods Corporation, General Mills, Inc., Gerber Products Company, Glidden-Durkee, Division of SCM Corporation, The Griffith Laboratories, Inc., H. J. Heinz Company, Henningsen Foods, Inc., Hershey Foods Corporation, Hoffmann-La Roche, Inc., International Flavors & Fragrances, Inc., Keebler Company, Kellogg Company, Knox Gelatine, Incorporated, H. Kohnstamm & Co., Inc., Kraftco Corporation, Lever Brothers Company, Libby, McNeill & Libby, Thomas J. Lipton, Inc., Oscar Mayer & Company, McCormick & Company, Inc., Merck & Co., Inc., Monsanto Company, National Biscuit Company, The Nestle Company, Inc., Owen-Illinois, Pet Incorporated, The Pillsbury Company, The Procter & Gamble Company, The Quaker Oats Company, Standard Brands Incorporated, Stange Company, Sunkist Growers, Inc., Sunshine Biscuits, Inc., Swift & Company, Uncle Ben's, Inc., Universal Foods Corporation, Welch Foods, Inc.

FOOD INDUSTRIES ADVISORY COMMITTEE

The committee serves as an advisory group and as a means of maintaining a close relationship between the Foundation's program and the technical staffs of the member firms.

PHILIP D. AINES
JAMES J. ALBRECHT
O. N. BREIVIK
JOHN C. BARD
HOWARD E. BAUMAN
EVAN F. BINKERD
W. A. BRITTIN
CARLOS CARIDAD
RICHARD J. COLEMAN
W. W. CRAVENS
EDGAR A. DAY
DOMENIC DE FELICE
NORMAN W. DESROSIER
K. G. DYKSTRA
ENIO FELICIOTTI
RICHARD FORSYTHE
I. E. FRIEDMAN
CHARLES J. GRIFFIN
RICHARD L. HALL
S. W. F. HANSON
WILLIAM J. HART, JR.
HAMILTON HERMAN
JOHN H. HOPPER
HARTLEY W. HOWARD
E. E. HOWE
I. J. HUTCHINGS
V. L. JOHNSON
GEORGE G. JORIS
C. H. KRIEGER
EARL E. LOCKHART
JOHN V. LUCK
R. B. MESROBIAN
E. W. MEYERS
O. NEAL MILLER
TRUE D. MORSE
R. O. NESHEIM
CHARLES F. NIVEN, JR.
RICHARD D. O'NEILL
PAUL E. RAMSTAD
GERALD REED
H. E. ROBINSON
WALTER H. C. RUEGGEBERG
LOUIS SAIR
H. C. SCOTT
PETER M. SCOCCA
ROBERT A. STEWART
J. R. STOCKTON
VERN L. STROMBERG
HORTON E. SWISHER
DEE TOURTELLOTTE
JAMES L. VETTER
LEONARD J. VINSON
F. D. WHARTON, JR.
SAMUEL ZUCKERMAN

The publication of NUTRITION REVIEWS has been undertaken to enable professionally trained people to keep abreast of current progress, and to have available an unbiased, authoritative review of the current research literature in the science of nutrition.

The Editorial Staff has been carefully selected so that the publication will merit, in reasonable degree, the confidence of the medical profession and others who work directly with the public in the field of nutrition. The service provided by the publication is distinct from that of an abstract journal, a review for laymen, or an extensive scientific review. Since the reviews as originally prepared by a member of the Editorial Staff are frequently modified by special referees and may be further modified by the Editorial Office in preparing final copy for the press, the Editorial Committee feels that it is preferable not to affix the names of Editorial Staff members to individual reviews. There is thus a high degree of group responsibility on the part of the Editor and Associate Editors.

Signed articles do not necessarily represent the opinion of the Editorial Staff.

Editor

D. M. HEGSTED, PH.D., Professor of Nutrition, Schools of Medicine and Public Health, Harvard University, Boston. Editorial Office, 665 Huntington Avenue, Boston, Mass. 02115.

Assistant Editor

DOROTHY CAMPBELL, 665 Huntington Ave., Boston.

Associate Editors

GILBERT B. FORBES, M.D.
University of Rochester

RICHARD J. JONES, M.D.
University of Chicago

MICHAEL C. LATHAM, M.B.
Cornell University

ROBERT B. MCGANDY, M.D.
Harvard School of Public Health

OLAF MICKELSEN, PH.D.
Michigan State University

RALPH A. NELSON, M.D.
The Mayo Clinic

ELMER H. STOTZ, PH.D.
University of Rochester

WILLARD J. VISEK, PH.D., M.D.
Cornell University

MARY ANN WILLIAMS, PH.D., University of California

Contributing Editors

G. A. O. ALLEYNE, M.D.
University of the West Indies

RICHARD M. FORBES, PH.D.
University of Illinois

LEON L. HOPKINS, PH.D.
U. S. Department of Agriculture

GILBERT A. LEVEILLE, PH.D.
Michigan State University

RICHARD L. LYMAN, PH.D.
University of California

KENNETH O. MADSEN, PH.D.
University of Texas

DONALD B. MCCORMICK, PH.D.
Cornell University

R. D. G. MILNER, M.D., PH.D.
University of Manchester

SUSAN OACE, PH.D.
University of California

QUINTON R. ROGERS, PH.D.
University of California

D. A. T. SOUTHGATE, PH.D.
University of Cambridge

MYRON WINICK, M.D.,
Cornell Medical College

VERNON R. YOUNG, PH.D., Massachusetts Institute of Technology

---

INFORMATION FOR SUBSCRIBERS

NOTICE: SUBSCRIPTIONS ARE FOR THE CALENDAR YEAR. ALL NEW AND RENEWAL SUBSCRIPTIONS WILL START WITH THE JANUARY ISSUE AND EXPIRE WITH THE DECEMBER ISSUE. Should any issue of the current volume be out of print at the time the subscription order is received, the pro-rata value of such numbers will be refunded to the subscriber.

Subscriptions should be sent to The Nutrition Foundation, Inc., 99 Park Ave., New York, N. Y. 10016. Rate $8.00 per year in the United States and other countries. A special student rate of $4.00 per year is offered to regularly matriculated students in colleges or universities whose subscription application is accompanied by an affirmation of student status signed by an authorized Department representative. Changes of address should be sent to The Nutrition Foundation. In the U. S. ZIP CODES must be included. Second-class postage paid at Baltimore, Md. 21202 and at additional mailing offices.

Note: Items may be quoted from NUTRITION REVIEWS without special permission. If quotations are made, the editors ask only that credit be given to NUTRITION REVIEWS and that they be made in such a way that the original meaning of the review is preserved.

XUM

THE NUTRITION FOUNDATION

OFFICERS

HERBERT E. LONGENECKER, *Chairman, Board of Trustees*

JAMES W. EVANS, *Chairman, Board of Directors*

A. R. MARUSI, *Vice Chairman, Board of Directors*

P. B. PEARSON, *President and Scientific Director*

HORACE L. SIPPLE, *Executive Secretary and Treasurer*

TRUSTEES

D. M. ANDERSON, *General Manager, Sunkist Growers, Inc.*
E. L. ARTZT, *Vice President-Group Executive, The Procter & Gamble Company*
G. F. ATKINSON, *Senior Vice President, Glidden-Durkee, Div. SCM Corp.*
J. P. AUSTIN, *President, The Coca-Cola Company*
W. G. BARKER, *President, Thomas J. Lipton, Inc.*
P. G. BEACH, *President, Oscar Mayer & Company*
*G. BEADLE, *President Emeritus, University of Chicago*
W. O. BEERS, *President, Kraftco Corporation*
F. L. BISSINGER, *President, Allied Chemical Corporation*
J. J. BURNS, *Vice President for Research, Hoffmann-La Roche, Inc.*
*E. L. BUTZ, *Vice President, Special Projects, Purdue University*
R. C. CAMPBELL, *President, Welch Foods, Inc.*
*H. E. CARTER, *Vice Chancellor for Academic Affairs, University of Illinois*
J. J. COADY, *President, Uncle Ben's Inc.*
C. W. COOK, *Chairman & Chief Executive, General Foods Corporation*
C. B. COX, *Executive Vice President, Armour and Company*
B. L. DURLING, *President, Stange Company*
J. EICHBERG, *President, American Lecithin Company, Inc.*
J. W. EVANS, *President, American Maize Products Company*
D. FLEMING, *Executive Vice President, Central Soya Co., Inc.*
R. T. FOOTE, *President, Universal Foods Corporation*
*C. FRANCIS, *New York, New York*
J. N. FRIEDMAN, *President, Florasynth Incorporated*
G. J. GOGNIAT, *President, The Nestle Company, Inc.*
G. A. GRAHAM, *Vice President, Knox Gelatine, Incorporated*
F. W. GRIFFITH, *President, The Griffith Laboratories, Incorporated*
D. E. GUERRANT, *Chairman & President, Libby, McNeill & Libby*
H. C. HARDER, *Chairman of the Board, CPC International, Inc.*
*J. G. HARRAR, *President, The Rockefeller Foundation*
*C. P. HASKINS, *Washington, D. C.*
R. S. HATFIELD, *Chairman and President, Continental Can Co., Inc.*
F. H. HEALY, *V. P., Research and Development, Lever Brothers Company, Inc.*
H. J. HEINZ, II, *Chairman of the Board, H. J. Heinz Company*
V. W. HENNINGSEN, JR., *Chairman of the Board, Henningsen Foods, Incorporated*
*REV. T. M. HESBURGH, C.S.C., *President, University of Notre Dame*
S. F. HINKLE, *Hershey Foods Corporation*
*G. W. IRVING, JR., *Chevy Chase, Md.*
E. C. JONES, *Executive Vice President, Owens-Illinois*
G. M. KELLER, JR., *President, Keebler Company*
*C. G. KING, *Institute of Human Nutrition, Columbia University*
E. R. KINNEY, *Executive Vice President and Chief Financial Officer, General Mills, Inc.*
E. E. LANGENAU, *Executive Vice President and Technical Director, Fritzsche Dodge & Olcott, Inc.*
*H. E. LONGENECKER, *President, Tulane University*
*J. W. MACY, JR., *President, Corporation for Public Broadcasting*
A. R. MARUSI, *Chairman & President, Borden, Inc.*
E. J. MASSAGLIA, *Vice President & General Manager, Chemicals Division, Atlas Chemical Industries, Inc.*
W. F. MAY, *Chairman of the Board & President, American Can Company*
C. D. MCNEAL, *Group Vice President, The Pillsbury Company*
*E. M. MRAK, *University of California, Davis, California*
W. B. MURPHY, *President, Campbell Soup Company*
*J. Q. NEWTON, *President, The Commonwealth Fund*
W. F. OLIVER, *President, Amstar Corporation*
E. A. OTOCKA, *Senior Vice President, National Biscuit Company*
*P. B. PEARSON, *President and Scientific Director, The Nutrition Foundation, Inc.*
G. M. PERRY, *President, Beech-Nut, Inc.*
R. H. PULVER, *Executive Vice President, H. Kohnstamm & Co., Inc.*
R. W. RENEKER, *President, Swift & Company*
H. L. RILEY, *President & Chief Executive Officer, Sunshine Biscuits, Inc.*
L. S. ROEHM, *Senior Vice President, Merck & Co., Inc.*
L. C. ROLL, *Chairman, Kellogg Company*
L. J. SAUERS, *Vice President, American Home Products Corporation*
B. F. SCHENK, *President and Chief Executive Officer, Pet Incorporated*
*F. SEITZ, *President, The Rockefeller University*
E. J. SPIEGEL, JR., *President, Alton Box Board Company*
R. D. STUART, JR., *President, The Quaker Oats Company*
J. SUERTH, *Chairman of the Board and Chief Executive Officer, Gerber Products Company*
*L. L. TERRY, *V.P. for Medical Affairs, University of Pennsylvania*
H. G. WALTER, JR., *Chairman and Chief Executive Officer, International Flavors & Fragrances, Inc.*
H. WEIGL, *President, Standard Brands Incorporated*
H. K. WELLS, *President, McCormick & Company, Inc.*
R. B. YERBY, *Vice Chairman of the Board, Del Monte Corporation*

*Representative of the public

CONTENTS OF VOLUME 29

No. 1, January 1971

On the Pathophysiology of Vitamin A Deficiency, by K. C. Hayes 3
Cellular Growth in Infantile Malnutrition 6
Pancreatic Alpha Cell Function in Man 8
Tryptophan and African Cardiomyopathy 10
Malnutrition with Early Treatment of Phenylketonuria 11
Influence of Malnutrition and Alcohol on Thiamine Absorption 13
Amino Acid Nutrition of the Chick—Essentiality of Proline and Glycine Biosynthesis 15
Urinary Methylmalonate and Hepatic Methylmalonyl CoA Mutase in Vitamin B_{12} Deficient Rats 18
The Hypothalamus and Food Intake Regulation in Response to Amino Acids and Protein ... 20
Lipotropes and Fetal Growth 23
Recent Books 24

No. 2, February 1971

Salt in Infant Foods, by Lloyd J. Filer, Jr 27
Behavioral Development During Recovery from Nutritional Marasmus 31
Drugs and Folic Acid Utilization 34
The Effect of Diet on Lipid Metabolism 36
Osteomalacia and Anticonvulsant Drugs 38
Intestinal Calcium Transport Mediated by Vitamin D 41
Synergism of Cobalt and Ethanol 43
Metabolic Effects of Starvation in Newborn Pigs 45
Hereditary Defect in Intestinal Iron Transport 47
Methionine, Vitamin E, and Selenium Toxicity 48
Letter to the Editor 50

No. 3, March 1971

Modified Food Starches for Use in Infant Foods, by Lloyd J. Filer, Jr 55
Dietary Fat and Carbohydrate Induction of Hyperlipemia 59
Alcoholic Ketonuria on a High Fat Diet 62
Blood Glucose and Diabetes Mellitus 64
Vitamin A and the Synthesis of a Lipid Containing Mannose in Rat Liver 67
Dietary Obesity in Seven Strains of Rats 69
Diet Induced Changes in Hexosemonophosphate Dehydrogenases and RNA Metabolism 72
Caloric Balance in Rats at High Altitude 74
The Effects of Malnutrition on Specific Amino Acids in the Serum 76
Letters to the Editor 78
Journal Announcement 79
Recent Books 79

No. 4, April 1971

Protein and Calorie Concentration, by B. M. Nicol 83
Hypomagnesemia in Protein-Calorie Malnutrition 89
Nutritional Trace Element Research 90
Biotin and Protein Biosynthesis 93
Effects of Dietary Changes on Kidney Metabolism 95
Metals as Constituents of Enzymes 97
Vitamin E and Heme Synthesis in the Rat 100
Recent Books 104

XUM

No. 5, May 1971

The Long-Term Consequences of Protein-Calorie Malnutrition, by J. Cravioto and E. R. DeLicardie ... 107
Infantile Obesity and Respiratory Infections ... 112
Absorption of Dietary Iron in Man ... 113
Responses of Rat Heart Muscle to Exercise ... 116
Catabolites of Thiamine in the Rat ... 119
Effects of Diet and Stages of Development on Intestinal Cells and Enzymes ... 121
Influence of Age and Strain on the Response of Rats to Dietary Fructose and Sucrose ... 124
The Metabolism of Mannoheptulose-$^{1\,4}$C by the Rat ... 126
Recent Books ... 128

No. 6, June 1971

Assessing the Energy Value of the Human Diet, by D. A. T. Southgate ... 131
Creatinine-Height Index in Malnourished Children ... 134
Rapid Growth in Chicks and Infants ... 137
Alcoholic Hyperlipidemia ... 140
Hair Changes in Human Malnutrition ... 143
Dietary Calcium and Lead Toxicity ... 145
Maternal Diet in Rats and Response of Offspring to Post-Weaning Infection ... 147
Effect of Calcitonin on Bone Resorption Induced by Excess Vitamins A and D ... 150
Meeting Announcement ... 152
Recent Books ... 152
Erratum ... 152

No. 7, July 1971

Mutants: Consumers with Special Needs, by Charles R. Scriver ... 155
Cellular Growth in the Fat Adolescent ... 158
Chemical Diagnosis of Fetal Malnutrition ... 160
Brain Growth and Prematurity ... 162
The Role of Insulin and Growth Hormone in Childhood Obesity ... 163
Metabolism of Vitamin D ... 165
Rates of Synthesis and Degradation of Hepatic Acetyl CoA Carboxylase in Fed, Fasted, Fasted-Refed, and Diabetic Rats ... 167
Prostaglandins and Lipolysis in Rat Adipose Tissue ... 170
Effect of Fasting on Ribosomal Control of Protein Synthesis in Rat Tissues ... 173
The Norman Jolliffe Fellowship—1972-1973 ... 175
Recent Books ... 176

No. 8, August 1971

Vitamin D: A New Look at an Old Vitamin, by H. F. DeLuca ... 179
Diet and Aflatoxin Toxicity ... 181
Growth and Development of the Fetal Rhesus Monkey ... 183
Nutritional Effects on Polyribosome Distribution and Protein Synthesis in Cultured Cells ... 184
Fat Cell Size and Lipid Metabolism ... 188
"Overnutrition" and Brain Function ... 190
Intra-Uterine Undernutrition and Brain Development ... 191

No. 9, September 1971

Function and Nomenclature for Two Mammalian Copper Proteins, by Gary W. Evans ... 195
Prenatal Nutrition and the Human Fetus ... 197
Dietary Cholesterol Versus Total Body Cholesterol ... 199
Epidemiology of Diabetes Mellitus ... 201
Results of Dietary Treatment in Phenylketonuria ... 203
Structure and Function of the Jejunum in Kwashiorkor ... 205

XUM

Fish Require Dietary Vitamin C 207
Enhancement of Liver Glucose-6-Phosphate Dehydrogenase by Dietary Carbohydrate and Insulin 210
Metabolism of Fatty Acids of the Palmitoleate Series in the Fat-Deficient Rat 213
Letter to the Editor 216

No. 10, October 1971

Growth Rate, Nutrient Intake and "Mothering" as Determinants of Malnutrition in Disadvantaged Children, by Ray Hepner and Norma C. Maiden 219
Humans as Walking Legumes 223
Nutrition and Infection: Cannibalism 226
The Etiology of Endemic Cretinism 227
Aflatoxin, Monkeys, and Humans 230
Body Composition in Cerebral Palsy 232
Availability of Iron 234
Influence of Alcohol and Choline Deficiency Upon Rat Liver Uptake of Choline 237
Announcement 239
Meeting Announcements 240
Recent Books 240

No. 11, November 1971

Cellular Development of the Human Fetus and Maternal Poverty 243
Soy Protein Quality 245
Anemia and Iron Intake 246
Regulation of Growth Hormone Secretion by Growth Hormone 248
Mobilization of Liver Iron by Ferroxidase I (Ceruloplasmin) 250
Zinc Homeostasis During Pregnancy 253
Fatty Acid Esterification in Rat Adipose Tissue from Various Body Sites 254
Parathyroid Hormone Effects on Mineral Absorption and Excretion 257
Trigonelline as a Major Urinary Metabolite of Niacytin in the Rat 260
Letter to the Editor 262
Recent Books 263

No. 12, December 1971

Pica and Lead Poisoning, by Vincent F. Guinee 267
Author Index 271
Subject Index 277

XUM